

ENVIRONMENTAL PROTECTION AGENCY

[EPA-HQ-OW-2015-0753; FRL_XXXX-X]

Recommended Aquatic Life Ambient Water Quality Criteria for Cadmium - 2016

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of Availability.

SUMMARY: The Environmental Protection Agency (EPA) is announcing the release of recommended aquatic life water quality criteria for cadmium. EPA has updated its national recommended ambient water quality criteria for cadmium in order to reflect the latest scientific information, and current EPA policies and methods. EPA's water quality criteria for cadmium provides recommendations to states and tribes authorized to establish water quality standards under the Clean Water Act. In adopting water quality standards, states set exposure protections for aquatic life; acute exposure to cadmium results in lethality, while chronic exposure to cadmium negatively impacts growth, development, behavior, reproduction, and immune and endocrine systems in aquatic life. Cadmium enters the environment by natural and human processes, however, human sources, such as mining and urban processes, are responsible for contributing approximately 90 percent of the cadmium found in surface waters.

FOR FURTHER INFORMATION CONTACT: Mike Elias, Health and Ecological Criteria Division, Office of Water (Mail Code 4304T), Environmental Protection Agency, 1200 Pennsylvania Avenue NW, Washington, DC 20460; telephone number: (202) 566-0120; email address: elias.mike@epa.gov.

SUPPLEMENTARY INFORMATION:

I. General Information:

A. How can I Get Copies of This Document and Other Related Information?

1. Docket. EPA has established a docket for this action under Docket ID No. EPA-HQ-OW-2015-0753. Publicly available docket materials are available either electronically through www.regulations.gov or in hard copy at the Water Docket in the EPA Docket Center, (EPA/DC) EPA West, Room 3334, 1301 Constitution Ave., NW, Washington, DC. The EPA Docket Center Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the Water Docket is (202) 566-2426.

2. Electronic Access. You may access this Federal Register document electronically from the Government Printing Office under the “Federal Register” listings FDSys (<http://www.gpo.gov/fdsys/browse/collection.action?collectionCode=FR>).

II. What Are EPA’s Recommended Water Quality Criteria?

EPA’s recommended water quality criteria are scientifically derived numeric values that protect aquatic life or human health from the deleterious effects of pollutants in ambient water. Section 304(a)(1) of the Clean Water Act (CWA) directs EPA to develop and publish and, from time to time, revise criteria for protection of aquatic life and human health that accurately reflect the latest scientific knowledge. Water quality criteria developed under section 304(a) are based solely on data and the latest scientific knowledge on the relationship between pollutant concentrations and environmental and human health effects. Section 304(a) criteria do not reflect consideration of economic impacts or the technological feasibility of meeting pollutant concentrations in ambient water.

EPA's recommended section 304(a) criteria provide technical information to states and authorized tribes in adopting water quality standards (WQS) that ultimately provide a basis for assessing water body health and controlling discharges or releases of pollutants. Under the CWA and its implementing regulations, states and authorized tribes are to adopt water quality criteria to protect designated uses (e.g., public water supply, aquatic life, recreational use, or industrial use). EPA's recommended water quality criteria do not substitute for the CWA or regulations, nor are they regulations themselves. EPA's recommended criteria do not impose legally binding requirements. States and authorized tribes have the discretion to adopt, where appropriate, other scientifically defensible water quality criteria that differ from these recommendations.

III. What is cadmium and why is EPA concerned about it?

Cadmium is a naturally occurring metal found in mineral deposits and distributed widely at low concentrations in the environment. Cadmium's primary industrial uses are for the manufacturing of batteries, pigments, plastic stabilizers, metal coatings, alloys and electronics. Recently, cadmium has been used in manufacturing nanoparticles (quantum dots) for use in solar cells and color displays. Cadmium is a non-essential metal with no biological function in aquatic life. Acute exposure causes mortality. Chronic exposure leads to adverse effects on growth, reproduction, immune and endocrine systems, development and behavior in aquatic organisms.

IV. Information on the Aquatic Life Ambient Water Quality Criteria for Cadmium

EPA prepared an update of the chronic aquatic life criteria document for cadmium based on the latest scientific information and current EPA policies and methods, including EPA's *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (1985) (EPA/R-85-100) and *Guidelines for Ecological Risk Assessment* (1998) (EPA/630/R-95/002F). The 2016 updated criteria include new data for 75

species and 49 genera not previously represented. The freshwater acute criterion was derived to be protective of aquatic species and further lowered to protect the commercially and recreationally important rainbow trout, consistent with procedures described in EPA's current aquatic life criteria guidelines. The freshwater acute value is slightly lower (i.e., more stringent) than the 2001 acute criterion for dissolved cadmium. The freshwater chronic criterion is slightly higher (i.e., less stringent) compared to the 2001 criterion for dissolved cadmium; this modest increase is primarily due to the inclusion of four new genera, and the reanalysis of other data.

The estuarine/marine acute criterion for dissolved cadmium is slightly more stringent than the 2001 recommended criterion, which is primarily due to the addition of new sensitive genera. Changes in suggested values between 2001 and 2016 can be found in **Table 1** below.

Table 1. Summary of 2001 and 2016 Aquatic Life AWQC for Cadmium.

	2016 AWQC Update		2001 AWQC	
	Acute (1-hour, dissolved Cd) ^c	Chronic (4-day, dissolved Cd)	Acute (1-day, dissolved Cd)	Chronic (4-day, dissolved Cd)
Freshwater (Total Hardness = 100 mg/L as CaCO ₃) ^a	1.8 µg/L ^b	0.72 µg/L	2.0 µg/L ^b	0.25 µg/L
Estuarine/marine	33 µg/L	7.9 µg/L	40 µg/L	8.8 µg/L

^a Freshwater acute and chronic criteria are hardness-dependent and were normalized to a hardness of 100 mg/L as CaCO₃ to allow the presentation of representative criteria values.

^b Lowered to protect the commercially and recreationally important species (rainbow trout), as per the 1985 Guidelines, Stephen et al. (1985).

^c The duration of the 2016 acute criteria was changed to 1-hour to reflect the 1985 Guidelines-based recommended acute duration.

V. What is the Relationship between the Water Quality Criteria and State or Tribal Water Quality Standards?

As part of the WQS triennial review process defined in section 303(c)(1) of the CWA, the states and authorized tribes are responsible for maintaining and revising WQS. Standards consist of designated uses, water quality criteria to protect those uses, a policy for antidegradation, and

may include general policies for application and implementation. Section 303(c)(1) requires states and authorized tribes to review and modify, if appropriate, their WQS at least once every three years.

States and authorized tribes must adopt water quality criteria that protect designated uses. Protective criteria are based on a sound scientific rationale and contain sufficient parameters or constituents to protect the designated uses. Criteria may be expressed in either narrative or numeric form. States and authorized tribes have four options when adopting water quality criteria for which EPA has published section 304(a) criteria. They may:

- (1) Establish numerical values based on recommended section 304(a) criteria;
- (2) Adopt section 304(a) criteria modified to reflect site-specific conditions;
- (3) Adopt criteria derived using other scientifically defensible methods; or
- (4) Establish narrative criteria where numeric criteria cannot be established or to supplement numerical criteria (40 CFR 131.11(b)).

EPA's regulation at 40 CFR 131.20(a) provides that if a state does not adopt new or revised criteria parameters for which EPA has published new or updated recommendations, then the state shall provide an explanation when it submits the results of its triennial review to the Regional Administrator consistent with CWA section 303(c)(1). The updated cadmium criteria supersede EPA's previous 304(a) criteria for cadmium. Consistent with 40 CFR 131.21, new or revised water quality criteria adopted into law or regulation by states and authorized tribes on or after May 30, 2000 are applicable water quality standards for CWA purposes only after EPA approval.

VII. Additional Information:

EPA conducted a contractor-led and independent external peer review of the draft Aquatic Life Ambient Water Quality Criteria for Cadmium document in October 2015. This document was released for 60 day public comment in 2016 and has been updated accordingly. The document may be found at: <http://www.regulations.gov>.

Dated:

Joel Beauvais,

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